

TRANSPARENT CONDUCTIVE OXIDES FOR PLASTIC FLAT PANEL DISPLAYS

ABSTRACT

A lightweight, flexible, plastic substrate used to construct displays, including flat panel displays, to package materials and for electro luminescence lamps is coated with at least one layer, such that the substrate has desired barrier and electrode characteristics. The display medium of the flat panel display is protected from oxygen and moisture in order to avoid degradation with the coating. The layer with barrier and electrode characteristics has both a low enough resistance to function as an electrode for the display, and low oxygen and moisture permeability. For lower permeability and/or higher conductivity, multiple alternating layers of barrier materials and conductive materials are applied. The barrier material includes at least one of a thin metallic film, an organic polymer, a thin transparent dielectric, a thin transparent metal nitride, and a thin transparent conductive oxide. The conductive material includes at least one of a thin transparent conductive oxide, a thin transparent metallic film, and a thin transparent metal nitride. Preferably there is a Polymer Multi Layer (PML) processed base coat deposited over the substrate. The base coat produces substrate smoothing, and more importantly, in combination with another layer, the base coat improves vapor barrier properties. In the preferred embodiment, a PML processed top coat barrier layer is deposited before the coating contacts a surface, such as a roller. The PML processed top coat also excludes moisture (water vapor) and atmospheric gases that chemically degrade the device performance.

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